CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

Satyaprit Das; Ashu Shrestha

Project Number

J0208

Project Title

How Much Energy Is Lost to Friction?

Abstract

Objectives/Goals

Hypothesis: Friction constitute most of the resisting energy of the motor
Objective is to Measure how much energy is lost to Friction in a Motor
Assumption: Rotating motor has a resisting force acting against it in the opposite direction (Rotational Friction)

Methods/Materials

Method:
- Bring out the stripped hard drive, tachometer, D.M.M, paper clip and the power supply. Straighten out the paper clip, and then cut off two inches off the paper clip. After that is done, shape the paper clip in U-shape.
- The power supply will have many cables, use the biggest cable, and then plug in the paper clip at the top where the green wires is and the black wire diagonal from it. Then connect the wire that reads p-3 into the hard drive.
Bring out the black construction paper and trace the hard drive disk onto the black paper. Draw two propellers onto the black construction paper. Cut out the propellers that you have just made. Later, there will be the rest of the paper disk that#s left over. Cut the part out.
- Assemble the disks back together. While the disk is spinning, point the tachometer at the disk.
- Find out the weight of the motor and discs, which is equal to mass. Record you results. Next, find the velocity or RPM (Rotation Per Minute), record your results. Then plug the Mass and Velocity in to the equation K(Kinetic Energy)= 1/2m(Mass)v(Velocity)^2
Materials: - 400 watt Power Supply, Stripped Hard Drive, Tachometer, Reflective tape, Black construction paper, Tape, Screw driver set, Compass, Ruler, D.M.M.(Digital Multi Meter), Stopwatch, Calculator, Scale, 1 Paper Clip

Results

Rotational Kinetic energy of the running motor is the energy lost to friction. Angular velocity = Omega (Ѳ)/t Where Omega (Ѳ) = angle traveled, t = in time t, Rotational inertia = Ѳ/t. Per the experiments the Results are: Work/second = 9.81 joules per 4 seconds, That equals 2.425 joules per second or 2.425 watts.

Conclusions/Discussion

- Our hypothesis is correct i.e. Friction constitute most of the resisting energy of the motor
- Every second the motor runs, it uses 2.424 joules of energy in the backward direction

Summary Statement

Our project was to find out how much energy is lost to friction when it opposes motion in angular direction.

Help Received

Both parents drove us to the destination, and both dads helped do a practice judging. Satyaprit's dad helped get materials and wirte report.